

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on May 6, 2002 and the Advisory Action mailed July 25, 2002.

Claim 1 is amended; as a result, claims 1-3 and 5-11 remain pending in this application.

§102 Rejection of the Claims

Claims 1, 2, 5, and 9-11 were rejected under 35 USC § 102(e) as being anticipated by Putambekar (U.S. Patent No. 5,821,603). As discussed, unlike the present invention, the Puntambekar reference describes a method for roughening and hardening a silicon nitride film. The Puntambekar reference does not describe a method for reducing profile distortion without roughening a silicon nitride substrate surface. The claims of the present invention describe a process that is free of roughening of the silicon nitride film. Furthermore, the Puntambekar reference describes treating a nitride film, not a silicon nitride film, such as is claimed.

The Puntambekar reference is directed to reducing anisotropic etch and preventing "problems of voids" of the nitride layer. (Column 5, line 57). The roughening that is performed in the Puntambekar process is not desirable in the process of the present invention. Page 2, lines 15-17, of the present application describe that "achieving precise transfer requires that any surfaces overlaid by a photoresist be substantially free of discontinuities." The process of Puntambekar actually makes discontinuities by roughening the surface.

In particular, the Puntambekar process employs oxygen at a rate of 0.5 to 15 sccm and an argon flowrate from 5 to 500 sccm in order to "remove a slight portion of the top surface of the photoresist layer 20, while simultaneously the argon ions roughen the upper surface of the photoresist layer." Thus, the ranges of flowrate and gases described by the Puntambekar patent, in particular, a high argon flowrate, have been developed for the purpose of roughening the surface of the photoesist layer. This result is contrary to what is claimed and therefore, the Puntambekar reference does not anticipate claims 1-2, 5 and 9-11. To the contrary, the Puntambekar patent teaches away from claims 1-2, 5 and 9-11.

The Examiner is citing TABLE II for support that the Puntambekar et al reference describes at oxygen flowrate of at least 300 sccm as acceptable. However, that is not what the

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Puntambekar et al. patent states. Table II describes an oxygen flowrate of 100 cc, not 300 sccm. Column 5, lines 47-49 state: "It is believed the following ranges for the foregoing parameters are acceptable: an oxygen flow rate ranging from 0.5-15 sccm.." This oxygen flow rate range, described in the patent as "acceptable" is a far cry from at least 300 sccm. The text of the patent does not explain or defend the oxygen flowrate in TABLE II. There is no reference that this flowrate is "acceptable."

Furthermore, Table II describes a pressure of 150 mT, which is many times lower than the pressure claimed in the present invention.

In order to anticipate a claim, a reference must have each and every element claimed. The Puntambekar patent describes a different method, for a different material, using a different pressure, different oxygen rate in order to achieve a different result from what is claimed. Puntambekar does not anticipate claims of the present invention.

Rejection Under Section 103:

The Puntambekar patent describes the importance of argon in roughening a surface. The gas flows described all have concentrations that are predominantly argon. The claimed gas flowrate in the present application is predominantly oxygen in order to AVOID surface roughening. The gas flowrate in Table II cited by the Examiner is 100 cc, not at least 300 sccm, as is claimed.

The Puntambekar reference has an end result much different from what is claimed in the present invention. As has been discussed in previous correspondence, the claims of the present invention utilize an oxygen flowrate much greater than is described in the Puntambekar, and a flow where oxygen is predominant. The claims do not identify a use of argon in order to roughen the silicon nitride surface. This is no accident. The desired result of the present invention is a surface free of discontinuities. Table II, cited by the Examiner, includes Argon to create the surface roughening. The desired result of the Puntambekar reference is a roughened surface. Puntambekar did not contemplate that one could create a surface resistant to discontinuity by treating it in an atmosphere of at least 300 sccm oxygen, at a vacuum of 3 to 6.5 Torr. Thus, the Puntambekar reference does not render the present invention obvious.

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CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6976 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Box AF, Commissioner of Patents, Washington, D.C. 20231, on this 6th day of August, 2002.

Name Tina Kohout

Signature [Signature]

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